City Traffic Engineer Comments:

The City had Parson Transportation Group do a study that originally had two main purposes: 1) to find another alternative that did not affect the McConville Property as drastically as the original above grade, VDOT planned, interchange (the land designated for a ramp was needed for the development) and 2) an alternative that provided reasonable future levels of service that did not cost over 30 million to complete. Based on these guidelines, Parsons developed 10 alternative concepts ranging from improving the existing intersection to building the original VDOT concept. Here are the summaries for each alternative as outlined in the study:

Alternative 1 (shown in Exhibit 7) consists of adding turn lanes to the existing intersections at Lakeside Drive at the Route 501 Expressway and Old Forest Road at the Route 501 Northwest Expressway. At Lakeside Drive at the Route 501 Expressway, left turn lanes would be provided for all approaches (currently only the northbound approach has dual lefts). The separate right turn lanes on the eastbound, westbound, and northbound approaches would be retained. At the Old Forest Road/Route 501 Northwest Expressway intersection, the eastbound Expressway approach would be re-configured to
provide one lane for free-right turns onto southbound Old Forest Road and the second lane would allow for both left and right turns which would be controlled by the signal. Southbound Old Forest Road would be widened to three lanes to Peace Street providing an acceptance lane for the free-rights from the Expressway. Northbound Old Forest Road would be widened to accommodate dual 300' left turn lanes onto the Northwest
Expressway. The Expressway would be widened to accommodate two lanes in the westbound/northbound direction – these two lanes would be narrowed to one just prior to the bridge over the railroad tracks. Accommodating two lanes on the Expressway in the westbound/northbound direction beyond the railroad tracks would require widening the bridge over the railroad tracks.

Similar to Alternative 1, **Alternative 2** (shown in Exhibit 8) would provide similar double left turn lanes for all approaches at the Lakeside Drive/Route 501 Expressway intersection. In order to provide for more ideal geometrics that would be precluded by some of the right-of-way constraints at the existing intersection location, the intersection in Alternative 2 would be shifted to the east. This shift would also provide the following benefits:
1. Better approach geometrics for the section of the Route 501 Expressway south of Lakeside Drive.
2. Ability to provide for free-right turns with acceptance lanes on each leg of the intersection (reducing overall vehicular delays at the intersection).
3. Ability to put the traffic that currently uses Peace Street shortcut from southbound Old Forest Road to westbound Lakeside Drive onto Old Forest Road. Shifting this shortcut traffic from Peace Street onto Old Forest Road is recommended as Peace Street is not designed to accommodate projected traffic loads.
It should be noted that one of the disadvantages of this alternative is that it does sharpen the curve on Old Forest Road between Lakeside Drive and the Route 501 Northwest Expressway.

Alternative 3 (Exhibit 9) is the first of the alternatives to provide for grade-separation. This alternative provides for a minimal footprint as well as the ability to provide for a large number of travel lanes through the interchange area that can then taper quickly once outside of the interchange area. The alternative splits the northbound and southbound lanes of the Route 501 Expressway and allows for access through a single-point intersection in between the travel lanes. While somewhat unconventional, this alternative accommodates travel demands within a relatively narrow right-of-way and also provides
significant benefits in terms of construction since traffic can be maintained on one side while construction occurs on the other and vice-versa. This alternative, as well as Alternatives 5

through 10, also provide for grade-separation at the Old Forest Road/Route 501 Northwest Expressway intersection.

Alternative 4 (Exhibit 10) creates a split intersection which allows each of the two intersections to operate with one less traffic signal phase than a full four-leg intersection. By coordinating these signals, the operations of the two intersections can provide for additional capacity overall. The improvement for this alternative also extends to the location of the current intersection of Old Forest Road and the Route 501 Northwest Expressway. Under this alternative, this intersection would operate as an at-grade signal with additional lanes on the approaches to the intersection. As with Alternatives 1 and 2, the southbound/eastbound approach from the Northwest Expressway would include a free right turn with appropriate acceptance lane on Old Forest Road. The northbound approach to the intersection would include dual through lanes and dual right turn lanes which could be free-flowing. A right turn lane is also recommended for the southbound Old Forest Road approach. Note that the Route 501 Northwest Expressway would have four lanes (two approach and two exit) between Old Forest Road and the railroad bridge, but would narrow to two lanes across the bridge (this alternative does not include widening the railroad bridge). One of the benefits of this alternative is that it can be constructed as an interim for ultimately implementing the recommendation of Alternative 3; and it provides similar benefits as Alternative 3 in terms of ease of maintaining traffic flow during construction. Note that the improved at-grade intersection at Old Forest Road and the Route 501Northwest Expressway included in this alternative could also be an option with Alternative 3 (this option is discussed further in Section 4).

Alternative 5 (Exhibit 11) provides for a standard diamond interchange with Old Forest Road functioning as part of the northwest quadrant ramp. The configuration also allows motorists traveling westbound on Lakeside Drive to turn right at the intersection on the east side of the Route 501 overpasses, thereby removing some traffic on Old Forest Road.

Alternative 6 (Exhibit 12) is similar to Alternative 5 with the exception of providing a loop ramp to accommodate the westbound Lakeside Drive to southbound Route 501 Expressway traffic. In Alternative 5, this traffic turned left at-grade at the intersection west of the freeway overpass.

Alternative 7 (Exhibit 13) incorporates the loop ramp of Alternative 6, and also provides additional relief for the intersection west of the freeway overpass (at Old Forest Road) by putting the southbound Route 501 to eastbound Lakeside Drive traffic on a free-flowing loop ramp.

Alternative 8 (Exhibit 14) provides only the loop ramp in the southwest quadrant of the interchange that Alternative 7 does. Together with Alternatives 6 and 7, this alternative allows for the testing of all combinations of loop ramps west of the freeway overpass.

Alternative 9 (Exhibit 15) allows for the removal of a traffic signal on the east side of the freeway overpass through two loop ramps: one is in the northeast quadrant of the Route 501/Lakeside drive interchange, while the other connects northbound Old Forest Road to northbound Route 501. With the loop ramp at Old Forest Road, traffic going from eastbound Lakeside Drive to northbound Route 501 would turn left at the traffic light at Old Forest Road and then take the loop ramp onto northbound Route 501. This alternative adds substantially more traffic to Old Forest Road north of Lakeside Drive than most of the other alternatives do.

Alternative 10 (Exhibit 16) is the recommended concept from a 2002 study performed by VDOT. This concept provides loop ramps in the northwest and southeast quadrants of the interchange. The advantage that this concept provides is that a portion of the heaviest left turn traffic at the current Route 501/Lakeside Drive intersection (the eastbound to northbound traffic) would be accommodated on the southeast quadrant free-flowing loop

ramp. The remaining eastbound to northbound left turns at the current intersection, which are destined to Old Forest Road, would turn left at the at-grade intersection on the east side of the freeway overpass.

Here is the table summarizing costs:

Exhibit 23

Summary of Estimated Costs for Interchange Alternatives (millions)

Alternative	Lane-Miles of Improvement	Roadway Cost	Structure Cost	Right-of-Way Cost	Total Cost
1	0.75	$1.96	$0	$0.77	$2.73
2	5.30	$9.26	$0	$4.04	$13.30
3	9.75	$13.75	$4.70	$8.68	$27.12
4	7.36	$10.84	$0	$5.21	$16.05
5	10.08	$14.04	$5.98	$9.80	$29.83
6	10.70	$14.63	$5.98	$10.10	$30.71
7	10.68	$14.65	$5.98	$10.11	$30.74
8	10.40	$13.86	$5.98	$9.71	$29.55
9	10.08	$14.64	$7.19	$10.81	$32.63
10	10.56	$14.75	$6.46	$10.40	$31.61

Note: These costs are planning-level and subject to change based on engineering and environmental considerations. Costs include 20 percent for engineering and contingencies. Costs are in 2005 dollars.

The recommendation of the Study was to go with Alternative 4. Alternative 4 provided the best levels of service in the future for the lowest cost (half of most of the above grade interchange improvements). It did not do as well as the interchange (or above grade) alternatives, but only by one level of service grade (a C instead of a B). Alternative 4 also had the least impacts on right-of-way as most of the new alignment is on land already purchased by VDOT. Alternative 4 is also upgradeable to an interchange (Alt. 5) with little reworking of what would already be built. The maintenance of traffic plan would also be a lot easier with Alt. 4 since very little has to be done in the existing rights-of-way.

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